Serotonin Present in Cerebral Cortex Neurons

Control | 2 weeks after Ecstasy | 7 years after Ecstasy

Image courtesy of Dr. GA Ricaurte, Johns Hopkins University School of Medicine
Defining Ecstasy
A derivative of amphetamine

MDMA, XTC, E, essence, Adam
What we know:
Ecstasy has short-term & long-term effects on the brain

Short term:
changes brain chemistry, behavior

Long term:
changes brain structure, behavior
How Do We Know?
Scientific research in animals and humans
Brain Areas Affected by Ecstasy

- neocortex
- basal ganglia
- amygdala
- hypothalamus
- hippocampus
Serotonin Nerve Pathways in the Brain

Raphe nuclei
The Serotonin Neuron

serotonin

serotonin receptor
Acute Effects of Ecstasy

- heightened perceptions
- stimulation
- reduced appetite
- elevated mood
Adverse Effects of Ecstasy

- clouded thinking
- hyperthermia
- disturbed behavior
- jaw-clenching
Life-Threatening Effects

- hyperthermia
- arrhythmias
- renal failure
Short Term Effects after Ecstasy is Gone

- Normal
- During Ecstasy: elevated mood
- After Ecstasy: depression-like feelings, irritability
Long Term Effects of Ecstasy: Animal Studies Indicate Neurotoxicity

Brain chemistry changes
- serotonin reduced
- serotonin metabolites reduced

Brain structure changes
- serotonin transporters reduced
- serotonin terminals degenerate
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Ecstasy Causes Degeneration of Serotonin Nerve Terminals
Ecstasy May Damage Brain Areas Controlling Memory

memory impairment

memory impairment